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Observations

on

Pleuritis

and its consequences including

Empyema.

By W. F. McClurg.

Pittsbourgh Pennsylvania.

Paſsd March 13th 1827
W. E. H.

"Hunc neque dira venena, nec hosticus aufert enſis;
Nec *laterum dolor*, aut tuſsis, nec tarda podagra:
Hora:

1826-7.

Pleuritis.

It has been customary with pathological writers in all ages, when treating of Diseases to divide them into certain Claſses and Orders.

And after numerous arrangements having been made, by as many different authors, modern writers on Diseases most generally follow that, of the venerable Cullen. In dividing inflammatory affections of the thorax, Cullen has given the generic name of Pneumonia to those of the lungs and of the membrane which envelops them. He has subdivided this genus into several species; but the one which I shall more particularly notice has been called Pleuritis, and in common language Pleurisy or inflammation of the Pleura.

Pleuritis may be distinguished, most generally, by the following symptoms; pain in the side, particularly under the false ribs, which is sometimes extremely acute, producing the

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most distreſsing anxiety; compelling the patient to lean to the side affected in order to relieve the tension produced by the inflammation and swelling of the part: the pain is likewise frequently lancinating, darting instantaneously from one part to another; the pulse is full, strong, tense, and remarkably hard and quick. It has been compared to the tense string of a musical instrument vibrating with quick alternations, however this is not invariably the case. It is attended most generally with flushings of the face, increased heat and redneſs of the whole body, rigors, followed by fever, thirst, restleſsneſs, with great anxiety, and sometimes dry and parched tongue, hard dry cough, accompanied with nausea; inability to lie on the side affected; respiration difficult or rather painful, inspiration much more so than expiration, because of the pain produced by expanding the lungs, and drawing up the ribs.

which is relieved again by expiring the air, so on alternately. If blood be drawn, it will generally exhibit the thick, sizy or buffy coat, and the cupped form which blood assumes, when drawn into deep vessels, on cooling, commonly an indication of severe inflammation in some part of the system.

The inflammation, which these symptoms point out, may be confined to a spot or may extend over the whole of one side of the thorax. I believe, however, that the irritation producing the inflammation is generally confined to a small compass; and that the inflammation gradually extends, by what Surgeons call the continuous inflammation, over the pleura covering the parieties of the chest the diaphragm, mediastinum and the lungs; and sometimes by the contiguous inflammation affecting even the substance of the lungs.

The inflammation involving this delicate

serous membrane, is produced in a variety of ways, the most frequent of which will be mentioned, not in the order of their occurrence but in that, in which they will be treated of, as this Phlegmasia will require some difference of management, according to its exciting cause.

The disease may arise from sudden vicissitudes of weather, exposure to strong currents of air, more particularly when the person has been heated above the natural standard, by dancing, running or any other employment calculated to accelerate the circulation of the blood and of course to quicken the pulse, by going into a damp or cold place when in a state of perspiration thereby suddenly suppressing the external exhaling process, the mouths of the secerning vessels of the subcutaneous arteries being contracted.

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It is very liable to result from wounds contusions and other external injuries of the thorax, more particularly from such as are produced by incised penetrating and gun-shot wounds, followed by a collapse of the lung, it may also happen from fractured or luxated ribs, and even from the operation of paracentesis thoracis.

The internal causes may be enumerated as follows, inflammation of some of the viscera of the abdomen or some other parts of the body extending by contiguous sympathy; the sequelæ of fevers; and it not unfrequently arises from degenerated pus or blood effused into its cavity.

Many practical Physicians draw no distinction between inflammation of the lungs and that of the pleura as the treatment in the two cases is most generally the same, but it is of the utmost importance for the Surgeon

to discriminate accurately between them, as the consequences of the Pleuritic are exceedingly different from those of the Peripneumonic inflammation.

Pleuritis may continue for a considerable length of time; indeed it may become chronic and require several months patience and perseverance to subdue it, but generally however it may be overcome in a much shorter time by active remedies judiciously applied, and usually gives way on the third, fifth, or seventh day. The time varies very much according to the treatment, age and constitution of the patient.

The Terminations are likewise various sometimes ending by a gradual subsidence of the inflammation, generally termed resolution, but even here, there is a small quantity of serum or coagulable lymph, secreted, and deposited on the surface of

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the Pleura, which does no injury, and is soon absorbed. But there are other and more important terminations of the disease.

As in all other serous membranes, inflammation of the Pleura may terminate First, by the secretion of Serum.

This Effusion is most liable to occur in persons of relax fibre, such as drunkards and other dissipated or effeminate people, from badly managed pleuritis, it sometimes occurs when the inflammation has been brought on by gun-shot or other external wounds, where the symptoms are not very violent; the Serum in this case would be discharged through the opening and finally by proper treatment, the secretion would cease, the external orifice heal up, and in this way, a perfect cure has been accomplished.

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a new train of symptoms ensue, the fluid first collects at the lower part of the cavity of the chest; and as the secretion increases, the patient will experience a sensation of weight on the diaphragm, difficulty of breathing particularly in the recumbent posture easily aggravated by any slight exercise, especially on ascending a height, uneasineſs at the lower end of the sternum; cough ensues, at first dry and difficult, afterwards mucus or phlegm is expectorated; œdema of the feet and lower extremities; great thirst; diminution of urine; and a great variety of attending circumstances.

These symptoms gradually increase, the fluid preſses upon the lung and impedes its functions more or leſs; giving rise to dyspnœa, oppreſsion, and other symptoms of Hydrothorax. This is always a serious malady, and when arising from internal

causes, usually proves fatal; but when caused by external agents, and in young persons of good constitution, the fluid may be removed, and a cure effected.

The Second termination is that, wherein coagulable lymph is secreted. This has already been noticed, but in that case the secretion was so small, that no permanent injury could result; but it is sometimes thrown out in such large quantities as to cause a very great thickening of the Pleura, giving it the appearance of a thick callous membrane ~~membrane~~, very uneven and irregular on its surface, of a rose-color, interspersed with spots and streaks of a darker and sanguineous hue, occasionally it is thrown out in the form of laminæ.

When the inflammation extends to both surfaces, that is, the opposing surfaces of the

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the Pleura costalis and Pleura pulmonalis, they are closely and inseperably connected or united into one solid substance by the secretion of this lymph; which action is going on at the same time on both surfaces; and they being in contact the capillary arteries, veins, absorbents et cet. are extended into the new lymph precisely in the same way that Nature effects the formation and nourishment of any other new formed part.

But there are cases, where the lung has collapsed, and these most generally occur from external wounds, here no such union or adhesion can take place; and there is, in addition to the lymph, an effusion of serum, or of a bloody fluid secreted from the secerning arteries of the inflamed surrounding membrane, which occupies the lower part of the cavity and frequently

covers the collapsed lung, having mixed with it a copious precipitate of coagulable lymph in the form of flocculi, this collection can only take place, where the external wound is closed.

Nature, in all her wondrous works, is not more to be admired, than in the mechanism, construction, and functions of the lungs; more particularly in her wise arrangement of separating one from the other; by this, she has made provision for some of the casualties, which fall to the unfortunate among mankind.

The beautiful and very important operations of the viscera of the thorax would frequently be instantaneously suspended, were they arranged in the same manner, as those in the abdomen, but as the viscera of the thorax perform more important functions in the animal

economy, and of consequence are more essential to life, Nature has provided for their greater security, by separating them all from each other.

Were it not for this important arrangement in the pleura, forming the mediastinum, the secretions of one side of the thorax would interrupt the functions of the others, and death would be the inevitable consequence. But fortunately for mankind, the functions of one lung, by this arrangement, are preserved, and are entirely sufficient to support life as is sufficiently proved.

In almost all of the preceding cases, the delicate membrane of the Pleura will be found thickened upon dissection.

There is still another way by which the inflammation of the Pleura is relieved, the Third and last which shall be noticed.

It is perhaps more rare than any other termination, but is much more interesting to the Surgeon; it is that by Suppuration. To discriminate and foretell when one secretion will occur in preference to another, is probably out of the power of the Physician; and however difficult this proceſs is to be explained, certain it is that Pus may be secreted from very different membranes, and from every part of the body.

A collection of Pus in the cavity of the Pleura, has been distinguished by the name of Empyema; and is often produced and kept up by the irritation of some foreign body; and by an external wound produced by any substance projected with violence against the parieties of the thorax; and constant irritation may be continued by a fractured rib; by pieces of cloth, bone, metal.

or other extraneous bodies lying loose in the cavity of the thorax.

Under these circumstances the whole surface of the Pleura secretes this purulent fluid, which descends to the bottom of the cavity, and fills it up as high as the external wound, through which it makes its escape, supposing it still remains open; but if the wound is closed the cavity is then completely filled with an increased quantity of fluid that accumulates and compresses the lung of the affected side. The diaphragm descends, the intercostal muscles swell out, the whole side of the thorax is raised up and presents a more arched and tumid appearance. The heart and mediastinum are pushed to the opposite side, preventing the full dilatation of that lung; and thus producing the most distressing symptoms,

which if not speedily removed, the patient must inevitably perish .. In these cases the lung is not always destroyed, but lies in a collapsed state at the posterior part of the cavity, most generally covered by an adventitious membrane; and resumes its functions when the pus is removed and the inflammation subsided, which circumstance however, seldom occurs as the unfortunate patient is generally carried off by hectic fever.

Empyema is sometimes the result of a chronic inflammation of the Pleura, and when this happens it may continue a long time, according to the strength and constitution of the patient.

A fistulous orifice is sometimes formed, through which, there is a constant discharge; or the pus may be prevented from oozing out by a compress and bandage and evac-

uated at periods, when the patient becomes uneasy, or when the irritation would be injurious. Although Empyema is generally formed by a slow process, yet it sometimes progresses with great rapidity frequently destroying the patient in a very short time.

This dangerous disease may take place not only from the Pleura when in a highly inflamed state, from which it generally proceeds, but likewise from inflammation, suppuration, & ulceration of some of the surrounding parts. As for instance from the liver, producing ulceration through the diaphragm and discharging into the thorax; or from the spleen in the same way; from the lungs; and from the cellular membrane exterior to the Pleura or in the mediastinum &c.

These cases although extremely rare do occasionally occur, and the fluid conveyed

into the thorax, differs materially both in its general appearance and consistence, which circumstances may perhaps be explained, by secretions from the different tissues, from the degree of inflammation producing these secretions, and likewise from the kind of inflammation which is of importance.

When from any cause Pus is collected in the cavity of the Pleura, it usually continues to increase, aggravating the symptoms of dyspnaea, oppression and sense of suffocation &c. and pressing in every direction, distends the Pleura, causes an enlargement of the affected side of the thorax and sometimes presses the mediastinum and heart from their natural situation. Such cases soon prove fatal by suffocation if not relieved.

In some few instances this degree of pressure causes ulceration either into the lungs and bronchia, the matter being discharged by

coughing; or externally between the ribs. When ever the Pus has an external outlet, by the original wound, by an ulcerated opening, or by a surgical operation, and where the patient has much strength of constitution, it has happened that the discharge continues copious for a long time, but eventually it gradually diminishes, while the cavity of the Pleura as slowly contracts in several ways; the compressed lung expands, the diaphragm ascends and becomes more prominent, the elevated shoulder and ribs descend, whilst the mediastinum and heart also return to their natural situation; so that every effort is made by Nature to diminish the cavity: in some instances the lung finally comes into contact with the opposing surface of the pleura-costalis, union takes place, and the cure is rendered perfect, more frequently the cavity, or a small portion of

it remains, and a fistulous orifice is formed, in other respects the patients perfectly recover; though fluids are discharged and the air enters during inspiration.

Few patients however, can support this discharge, and these abscesses almost always prove sooner or later fatal, especially in those cases, where the irritation is kept up by foreign bodies, or a necrosed rib, but even here, the patient often lingers for years and is finally destroyed by hectic wastings.

Treatment.

The management of this disease has varied exceedingly, in the different periods of medical science, according to the prevailing doctrines of the times; and some of the most eminent amongst the older Physicians, advocated plans of cure diametrically opposite. But as the nature of the disease, in the course of time, and of improvement in medicine, became

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better understood, bloodletting was so obvious a means of cure that it was most generally resorted to. But however, the practice is pretty well established in common cases, and I will endeavour to point it out.

In all acute cases, we now begin by extracting blood in large quantities, and always until we have made an impreſsion upon the system. The indications of cure are two, the first is to remove as far as poſsible the cause of the complaint, and the second is to change or restore to health the morbid condition of the bloodveſsels and parts concerned in the production of the disease.

The former is to be fulfilled by extracting ʒXX or ℥XXX of blood, or as I have just mentioned, until we have made a decided impreſsion, it will of course be understood, that the quantity must be in proportion to the age and vigor of the patient.

Experience has proved that it is much better to draw blood in pleno rivo, and very copiously, than small quantities oft repeated. It will be observed that I am now speaking of the commencement of the disease in the acut form, and this treatment will be applicable to it, from whatever cause it may have originated, with the few exceptions, to be noticed hereafter.

The patient must now be confined to bed in the horizontal posture.

After the circulation is sufficiently reduced we may then resort to local remedies, for the purpose of more effectually relieving pain and inflammation, of these perhaps cups and leeches should be first applied; vascular action being reduced by the preceding means, blisters will be found to be of immense importance, and with their aſsistance added to the more active

means already spoken of; we may most generally subdue entirely the inflammation.

As cooperating with these measures, we should have recourse to purgatives, indeed moderate purging should never be neglected and patients will be able to bear it much better, than is generally imagined.

Purgative medicines produce a new determination, and are beneficial, not only on account of the reduction of vascular action produced by means of the secretions, induced by them, but likewise for the revulsion of the blood, it being sent downwards.

Treatment of the Terminations as Consequences of Pleuritis. First of Hydrothorax or of effusion of Serum. When an Effusion has taken place, from the inflammation produced by an external wound, and where of course the lung has collapsed; if the external orifice still remain open, we must

endeavour to keep it so, that we may with more facility evacuate the effused fluid, which should be done from time to time in order to prevent too great compreſsion of the opposite lung; and in the meantime we must employ such other remedies as have a tendency to leſsen the effusion and cure the inflammation.

As the inflammation subsides the secretion will decrease, the lung expand, adhesions take place, and now the orifice may be closed; in this way a perfect cure is sometimes effected, when the patient is young and of good constitution.

But when Hydrothorax takes place from internal causes, the case will be much more difficult to manage, and almost always terminates in death, but so long as life and hope remain we must endeavour to leſsen the effusion and re-

move the morbid disposition of the veſsels themselves. And for these several indications, we must prescribe such medicines as will promote the absorption of the fluid and if poſsible prevent its recurrence.

The bowels are generally constipated, by removing this, will have the effect of exciting the absorbent system; and for this purpose we may use some of the drastic purgatives, such as calomel, jalap, gamboge, elaterium, croton oil, scills &c. Some of these in combination will fulfil both indications, cal. and scill; or jal. and sup. tart. potaſs. have proved very succeſsful in many instances, where the other circumstances have been attended to, and the patient of good constitution.

When the effusion of serum is so great as to fill the whole cavity of the Pleura and produce symptoms of suffocation by preſsure

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upon the lungs, if we cannot excite the absorbent system to take up the fluid as fast or faster than it is secreted, we must resort to the operation of Paracentesis Thoracis in order to relieve the patient and prevent immediate death.

Although this operation has been successfully performed, it by no means cures the disease, it removes one source of danger, but may sometimes do mischief by creating a new inflammation, and very seldom affords permanent relief.

The great danger of puncturing the thorax is the liability of producing inflammation which may extend to the lung and other parts of the cavity, by the continuous membrane of the Pleura. And besides, which the lung is very prone to collapse; unless we can relieve the previous inflammation and prevent another from

supervening, the operation is likely to prove more prejudicial than useful, however by keeping the orifice closed with a compreſs and bandage, we may evacuate the fluid when neceſsary, and thus prevent its increase, until, in the course of time, by proper medicines low-diet, rest &c. we may probably finally effect a perfect cure.

For the preceding reasons this operation is now seldom performed, and indeed never should be attempted untill we have tried all other remedies without effect, it may then be performed as a dernier resort; in young persons free from constitutional disease.

The Second termination of Pleurisy is that by coagulable lymph, which, except in particular cases, requires no serious attention from the Surgeon, as adhesions are very often the result: and are always advantageous to the patient as they pre-

vent the effusion of serum, blood, pus, &c. into the cavity of the Pleura.

Where, however, adhesions cannot take place from collapse of the lung, and this viscus becomes covered with a membranous substance formed by the coagulable lymph the external orifice of the Pleura should be closed immediately, supposing one exists, as by this means we will be now likely to prevent the inflammation from extending to other parts, and also of running on to the suppurating stage.

The Last termination of Pleuritis, which I shall mention, is that by the secretion of Pus; like the serous effusion, it is presented to us under two different circumstances. First, where there is an external opening into the cavity of the pleura, and Second, where this cavity is entire. In both cases, the lung is more or less collapsed

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in proportion to the degree of exposure or compression &c.

Where there is an external opening, and the Pus has a free outlet, the primary object of the Surgeon should be to facilitate Nature's efforts for the obliteration of the cavity of the Pleura, and at the same time, prevent the accumulation and consequent stagnation of Pus in this cavity, after it has degenerated from exposure to the atmospheric air.

The stagnation of Pus is to be prevented by a proper position, and by the use of injections of tepid water, milk and water, or simple mucilaginous liquids, by which the cavity may be completely cleansed.

To facilitate the expansion of the lung and the consequent obliteration of the cavity of the Pleura, the external wound is to be kept closed as much as possible, that the atmos-

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pheric air may not enter at every inspiration into the cavity of the Pleura; thus preventing the dilatation of the lung, hence the orifice should be closed during expiration, and hence also the dreſsings are seldom to be removed, unleſs we have reason to believe that too much Pus is accumulating; or that it has become irritating; in either of which cases the orifice is to be opened and the discharge facilitated by injections &c. after which it is to be closed in the same careful manner.

Our objects in all such cases should be to facilitate the discharge of Pus, and to prevent the entrance of the atmospheric air.

To accomplish these objects, some of the French Surgeons have proposed to fill the external orifice with threads, the extremities of which hanging in the thorax, would extract the Pus, as a Syphon, while the air

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would not be admitted, and in some instances this plan may prove very useful, but the employment of cannulæ, gum-elastic tubes &c. can only prove injurious.

These means will contribute greatly to promote the dilitation of the lungs, and in patients of robust constitutions may often succeed, but of course will never answer as long as any source of irritation remains, hence all foreign bodies are to be removed, sometimes by incisions into the Pleura and sometimes by injections, by which, if loose they may be washed out. Should one or more ribs be necrosed, no hope of recovery can be entertained until exfoliation has taken place or what seems preferable, until the dead part has been excised and removed by the Surgeon.

Notwithstanding however, the best efforts some cases are absolutely incurable in consequence of the indurated or otherwise dis-

eased state of the lung, preventing its expansion and which is very apt to be found, in all old cases. In recent cases we may hope for a cure after the first danger from inflammation has been surmounted, and all foreign substances removed.

The Second case in which this complaint is presented to us, is, with the cavity of the Pleura entire, the Pus distending it in every direction and compressing the lungs, so as greatly to impede or destroy their functions. The important question to be decided in such cases is, whether the Pus should be evacuated by puncturing the Pleura?

In perusing works on this important subject, we find, that the generality of Surgeons advise the puncture to be made where the existence of Empyema has been satisfactorily determined, but few of them appear to speak from much experience, or give very precise

directions on this subject. Endeavouring to follow as heretofore our rule of never directing "any thing in the Profession without a good reason" let us remember the dangers of this operation on the one hand, and on the other the danger of the disease.

If a free opening be made into the cavity of the Pleura whose sides cannot collapse, a large portion of the Pus will be evacuated and atmospheric air will enter to occupy its place. The first danger therefore, arises from a violent continuous inflammation, spreading from the puncture over the whole surface of the Pleura, producing great constitutional irritation, and often death.

And second this irritation is often greatly aggravated from the decomposition of the Pus, occasioned by the presence of the atmospheric air. The entrance of this gaseous mixture, says a celebrated french author is in

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is injurious whatever fluid may be present, but more especially when Pus is effused.

And thirdly should these dangers be escaped the patient may and generally will be exhausted by the profuse discharge, which takes place from this very extended surface. By one or all of these causes the unfortunate patient is very generally destroyed, but as formerly mentioned recoveries do sometimes occur. On the contrary if the disease be left to itself the Pus may continue to accumulate, the difficulty of respiration increase, a slow fever be kept up, and suffocation even be induced.

Such are the circumstances of the case, and the proper principle or rule of practice hence to be deduced, seems to be very clear, namely never to operate for Empyema until the patients life is endangered by the quantity of Pus collected. So long as symptoms of suffo-

cation are absent, the Surgeon should be contented with medical means to promote the absorption of the fluid (or to discuss this pleuritic abscess, if we may be permitted so to term it) for as absorption advances the lung will expand, and a permanent cure may occasionally be effected with much less risk, than by opening the thorax.

When however the distention is so great, as to displace the heart and lungs, and to endanger life, no choice is left for the Practitioner, the puncture must be immediately made.

After the operation has thus been determined upon, the next question is, as to the kind of opening to be made, whether large or small?

Boyer, the writer alluded to above, in his very valuable work, discusses this point, and after deducing some facts and cases, concludes, that when the Empyema is not very considerable and when it has been formed rapidly, an

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an incision of moderate size should be made, a portion of the Pus evacuated, and the entrance of atmospheric air (if poſsible) be prevented by a doſsil of lint, secured by a thread, so as to fill the orifice completely; but that when the Empyema is old and of large size, a small puncture, should first be made and allowed to heal, afterwards to be repeated, three or four times, so as to allow the lung to expand in some degree, before a free incision is made into the thorax, which would otherwise be very dangerous from the extent &c. of exposed surface.

For an account of the operation of Paracentesis Thoracis, I beg leave to refer the reader to Profeſsor Gibson's excellent work on Surgery, vol. 2. p. 351. and also to S. Cooper's First Lines of the Practice of Surgery, vol. 1. p 584. &c. &c. &c.

FINIS.